

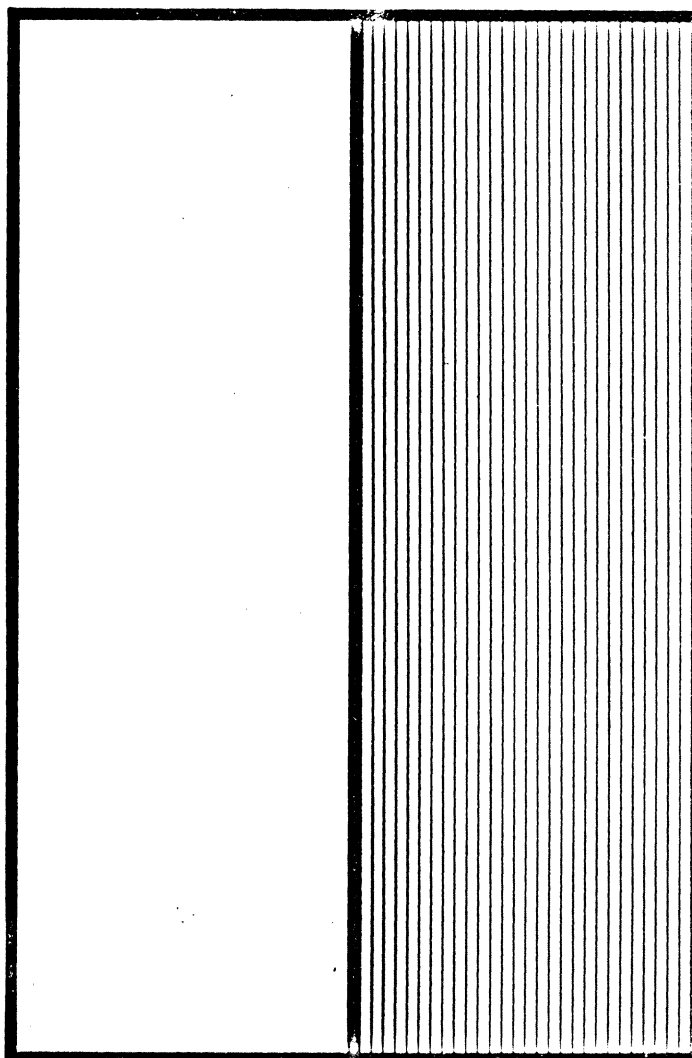
4091703



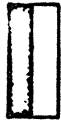
UNIVAC 9400 SYSTEM

PROGRAM DESCRIPTION DRAWING

CUSTOMER
ENGINEERING



SPERRY RAND



UNIVAC

DRAWING NO. 4091703

REVISION -

CUSTOMER ENGINEERING
PRODUCT DIAGNOSTIC SOFTWARE

9400 - 5024/8424 or 8425 Disc Functional Test
D2010

SIGNATURE

TITLE

DATE

APPROVAL _____

APPROVAL _____

APPROVAL _____

APPROVAL _____

REVISION STATISTICS RECORD

4091703

DWG REV	MSTR REV	RELEASE DATE	DESIGNER NAME	EIR NUMBER	FCO NUMBER
-	N		PDS Phila., Pa.	C12607	

REVISION DESCRIPTION RECORD

4091703

REV	DESCRIPTION
-	Release to 9400 Test Library

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1. INTRODUCTION

1.1 Purpose. This document describes a 9400 Maintenance test program for the 5024/8424 of 25 Subsystem.

1.2 Major Objectives. The objective of this test program is to perform a test of the 5024/8424 or 25 Subsystem. Test organization and operator options are intended to satisfy the needs of Design, Quality Control and Field Engineering personnel in checkout, acceptance and maintenance activities.

1.3 Equipment Configurations. All equipment configurations must be connected to a Selector I-O channel of the 9400 Processor. This test will operate the following equipment configuration:

- Disc File Control - Type 5024
- Disc Drive - Type 8424 or 25
- Disc Pack Assembly - Type F12 14-01

1.4 Associated Software. This program has DSKH included as an integral part of the program. This is the standard disc handler routine used by all Disc Maintenance test programs. It is the interface between the program and MCR, which performs program load, parameterization, execution, deletion, I-O handling, and message handling.

1.5 Reference Documents

DRAWING

DESCRIPTION

S70040

UNIVAC 9400 Processor, Type 3019-00 and -01.
UNIVAC 9400 Dual I-O Selector Channel, Type
XXXX-00 and -01.

P10076

Disc File Control, Type 5024.
8424 or 25

4091622

Maintenance Control Routine.

4091623

Parameter and Message Routines.

4091670

5024/8414 Disc Program Handler.

2. FUNCTIONAL DESCRIPTION

2.1 General Organization. This program is a basic functional test of the 5024/8114 disc subsystem. It starts with an On Line test to see if the addressed device is available. Test I-O, Sense, and No Operation commands are tested. Set File Mask commands are issued as simple one-byte output commands. Thirty-two bytes of sense data are read. Seek and Recalibrate commands are then tested, followed by a more extensive Seek test. All Search commands are tested, along with simple Reads. Then all Reads and Writes are tested.

2.2 Program Description.

2.2.1 Test 1 (Group Test)

Objective - The objective of test 1 is to enable several tests to be internally selected simply by entering subtest 1. Test 1 selects tests 2 thru 7.

Method - The program places bits into the parameter location which tells DSKII which tests to enter.

2.2.2 Test 2 (On Line Test)

Objective - This test determines the status of a given selected device.

Method - Test I-O, No Operation, and Sense commands are issued singly and in chains to determine correct device selection, data input, and command ending conditions. Set File Mask commands check data output and ending conditions.

2.2.3 Test 3 (Long Sense)

Objective - This test determines the present condition of the control unit.

Method - Thirty two bytes of Sense data are read. Since the condition of this data depends on previous control unit and disc actions, it is impossible to predetermine what this data should be. Therefore, all 32 bytes are typed out in hexadecimal.

2.2.4 Test 4 (Seek Test)

Objective - This test checks all Seek and Recalibrate commands in one and two interrupt conditions. It also checks the head selection and positioning mechanism and the position counters in the control unit. The timer must be enabled when running this test.

Method - Various Seek commands (including Recalibrate) are issued, and tests determine whether one or two interrupts occur. Seeks are then chained to Read HA commands to determine that the correct tracks have been found. Invalid seeks are then issued to cylinders 406 and 455, with the results checked against expected results. The following chain is then performed for every head of each single bit cylinder address:

Recalibrate
Seek Cylinder c, head h
Read HA

Home addresses are checked to assure that the correct track has been located.

The following chain is then performed for every head of each single bit cylinder address:

Recalibrate
Seek Cylinder c, head h
Read HA
Seek Cylinder 16, head 0
Read HA
Seek Cylinder c, head h
Read HA

The three Home Addresses are checked to assure that the correct tracks were located.

2.2.5 Test 5 (Prep for Search Test)

Objective - This is not a test. Its purpose is to find a given track for the Search test and write four known records on the track.

Method - The program finds cylinder 70, head 8 and checks that it is at the correct track. It then writes four records on the track. All records are read back and compared to the original data.

2.2.6 Test 6 (Search Test)

Objective - This tests all Search commands with all results. If the Search Feature has been selected under the "F" parameter then the Search Key Data commands will be tested.

Method - The program locates cylinder 70, head 0, and reads the data that is there. If it is the correct data, it proceeds with the test. Each Search is followed by a Read, and the input is checked in every case. The ten different Search commands are tested without the "M" bit, then retested with the "M" bit. The Search Equal or High commands are tested to find equal and to find high. After checking the Searches on the regular records, they are performed on the track descriptor record (Record 0).

2.2.7 Test 7 (Read-Write Test)

Objective - This tests all Read and Write commands, with the exception of Initial Program Load and Write Special Count, Key, Data. These two commands are left for later testing.

Method - The program locates cylinder 80, head 4 and reads HA and EO. If these compare to what they should be, we Search for EO and Write CKD, R1. Then the various Read and Write commands are tested. Checks insure that format writes erase the rest of the track and that non-format writes do not disturb any other records. All bit combinations are tested, as well as long and short data counts. End of File records are tested with and without keys. Each of the Read commands is tested with the "M" bit, which causes head switching.

3. OPERATING PROCEDURES

The Disc Handler Routine DSKH is used as a standard interface between the program and MCR. All operating procedures described in the DSKH documentation hold equally well for this program.

3.1 Initialization. See DSKH documentation. The program is called by typing in the name D2010

3.2 Test Program Parameters. See DSKH documentation.

3.3 Test Program Messages. The DSKH documentation describes all test entry and exit messages and a standard I-O error message. Data errors are detected by the program, and all data error messages are contained in the program. Register 9 is used to jump to the various error routines, so its contents are printed with most error messages.

3.3.1 Test 1 - A simple parameter setting is performed here, so no errors can occur.

3.3.2 Test 2 - The following messages tell the status of the subsystem and require operator intervention:

5024 OFF LINE
DEVICE dddd OFF LINE

Error messages in this section are as follows:

```
-- ERROR TEST I-O, DEVICE dddd
IC$SF XXXX IC$ENX XX IC$SB XXXXXXXXXXXX
-- BYTE CNT ERR IC$BCW XXXXXXXX IC$BDC XXXX
EXPCF XXXXXXXX XXXX
-- R9 XXXXXXXX SENSE ERROR
IC$SB XXXXXXXXXXXX XPECT XXXXXXXXXXXX
```

3.3.3 Test 3 - This test normally prints the following:

```
-- LONG SENSE, DA dddd
XX ... 32 BYTES ... XX
```

The following error message may occur:

```
-- R9 XXXXXXXX LONG SENSE ERR
IC$BCW XXXXXXXX IC$BDC XXXX
XPCT XXXXXXXX XXXX
```

3.3.4 SUBSYSTEM ERROR MESSAGES - Most status error messages fit the following format.

```

I hh:mm j SENSE ERROR DS ss
*R hh:mm j DISC DA Oddd TST tt
CAW: aaaaaaaa RBC : nnnn
CCW: cccccccccccccccc
SNS: 0 1 2 3 4 5 DS
EXP: sb sb sb sb sb sb ss
REC: sb sb sb sb sb sb ss
CHAIN
cccccccccccccccc
cccccccccccccccc
cccccccccccccccc

```

WHERE:

a = The address of the first CCW of the command chain
c = The eight bytes of the CCW
d = The device address
h = Time in hours
j = Job number
m = Time in minutes
n = The number of residual bytes
s = The device status byte
sb = The sense bytes
t = The test number in HEX.

Abbreviations are defined as follows:

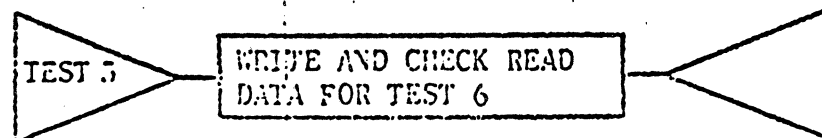
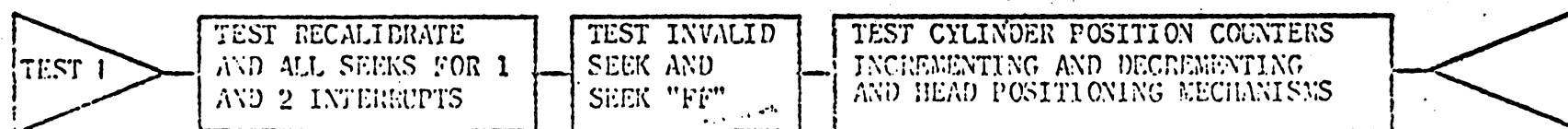
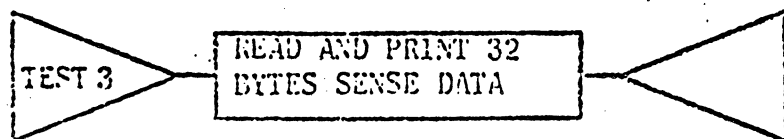
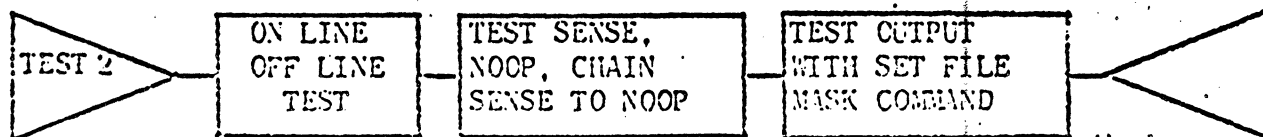
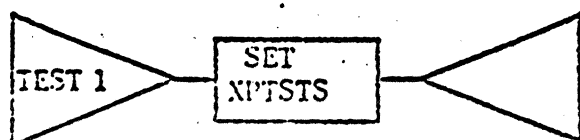
CAW - Channel address word (address of first CCW in chain)
 CCW - Channel command word (command that failed)
 DA - Device address
 DS - Device status
 EXP - Expected
 RBC - Residual byte count
 REC - Received
 SNS - Sense bytes
 TST - Test

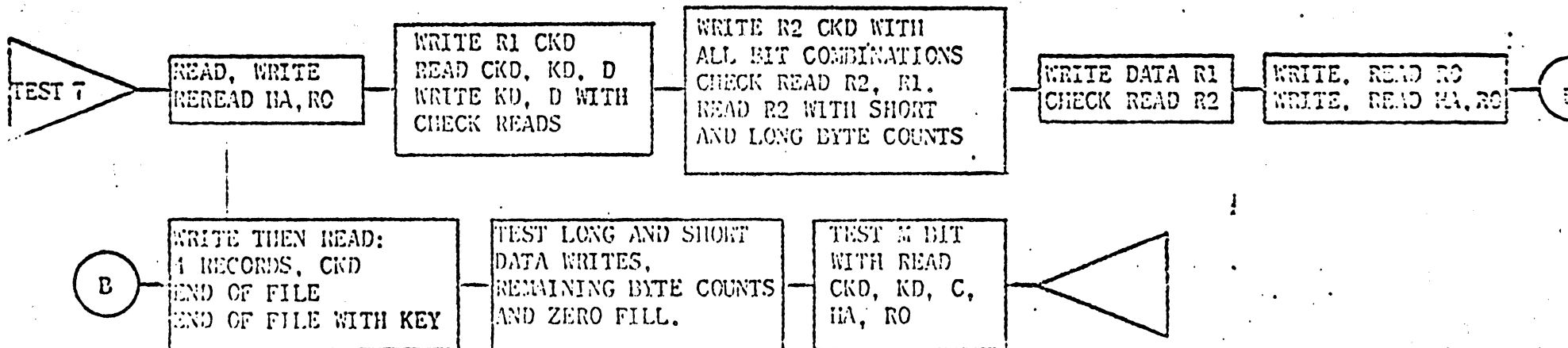
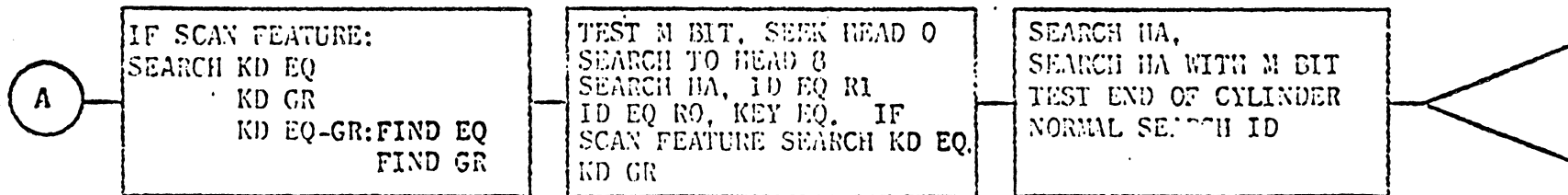
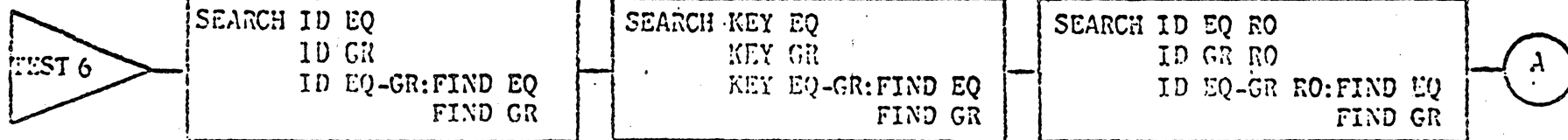
CHAIN: is followed by the complete command chain that caused the sub-test to fail. This chain can be used to reconstruct the error OFF-LINE.

4. SUPPLEMENTARY DATA

4.1 SUPPLEMENTARY SOFTWARE INFORMATION Each test of the program is entered separately by DSKH and stands alone. It could be extracted from the rest of the program and either be eliminated or assembled by itself with DSKH. The diagrams on the following pages show the general makeup and format of the program as well as what is being tested by the individual tests.

4.2 SUPPLEMENTARY HARDWARE INFORMATION See DSKH documentation.





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